



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/401,701	09/23/1999	CARL V. NELSON	1403-SPL	5022

7590 11/04/2003  
FRANCIS A COOCH PATENT COUNSEL  
APPLIED PHYSICS LABORATORY  
THE JOHNS HOPKINS UNIVERSITY  
11100 JOHNS HOPKINS ROAD  
LAUREL, MD 207236099

EXAMINER

TSAI, CAROL S W

ART UNIT PAPER NUMBER

2857

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/401,701

Applicant(s)

NELSON ET AL.

Examiner

Carol S Tsai

Art Unit

2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 September 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-14 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,646,525 to Gilboa in view of U. S. Patent No. 4,829,250 to Rotier and U. S. Patent No. 5,615,132 to Horton et al.

Gilboa discloses a magnetic sensor system for determining the three-dimensional position, velocity and acceleration of an object utilizing magnetic field currents, the sensor system being capable of operating within close proximity to metal surfaces and metal objects, comprising: an object, the position, velocity and acceleration of which are to be determined (see Abstract, lines 1-12; and col. 2, lines 11-16; and col. 5, line 9 to col. 7, line 51); a three-dimensional fixed reference frame of known dimensions in which the object is located with the fixed reference frame (see col. 2, lines 3-6; col. 8, lines 29-38; and col. 11, lines 43-47); a power source (current drive & oscillator 50 shown on Fig. 8) capable of generating a magnetic field within the fixed reference frame (see Abstract, lines 1-12; col. 2, lines 3-64; col. 9, line 59 to col. 10, line 12; col. 10, lines 46-62; col. 11, lines 48-51); a magnetic field transmitter, the transmitter

Art Unit: 2857

operatively interconnected to the power source and capable of being geometrically arbitrarily oriented relative to the fixed reference frame (see col. 3, lines 4-7; col. 4, lines 45-65; and col. 12, lines 44-47); at least one magnetic field receiver, the receiver capable of receiving electronic signals from the transmitter and further capable of being geometrically arbitrarily oriented related to the fixed reference frame (see col. 2, lines 44-50; col. 6, line 64 to col. 7, line 10; and col. 11, lines 60-65); and a programmed computer, the computer capable of receiving the signals from the receiver and capable of calculating the position, velocity and acceleration of the object based upon the signals (see Abstract, lines 6-12; col. 2, line 12 to col. 3, line 38; col. 6, line 64 to col. 8, line 16; and col. 11, lines 52-59).

Gilboa does not disclose a plurality of magnetic field transmitters.

Rotier teaches a plurality of magnetic field transmitters (see Abstract, lines 1-7 and col. 3, lines 18-29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gilboa's device to include a plurality of magnetic field transmitters, as taught by Rotier, in order that pilot's helmet sight application can be calculated in relation to a reference axis of the aircraft.

Gilboa does not disclose applying an extended Kalman filter for calculating.

Horton et al. teach applying an extended Kalman filter for calculating (see col. 2, lines 41-51 and col. 8, lines 39-53).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gilboa's device to include applying an extended Kalman filter for

calculating, as taught by, in order to estimate the position and velocity of moving object from noisy measurement of range and bearing.

As to claim 2, Gilboa does not disclose expressly the power source being capable of generating AC magnetic fields.

It is, however, considered inherent that Gilboa provides the power source being capable of generating AC magnetic fields (see col. 4, line 66 to col. 5, line 4), because it is known to be a necessary functionality that current source is capable to produce the magnetic field.

As to claim 3, Gilboa also discloses the transmitter being a permanent magnet (permanent magnet 63 shown on Fig. 9B).

As to claim 4, Gilboa also discloses the receivers being Hall effect sensors (see col. 2, lines 44-50 and col. 4, lines 51-61).

As to claims 5 and 7, Gilboa also discloses the sensor system being capable of recording individual receiver signals at high speed (see col. 6, line 64 to col. 7, line 10).

As to claim 6, Gilboa also discloses the sensor system being capable of being self-calibrating (see col. 7, lines 21-26).

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gilboa in view of Rotier as applied to claim 1 above, and further in view of U. S. Patent No. 5,307,072 to Jones, Jr.

As noted above, Gilboa in combination with Rotier teach all the features of the claimed invention, but do not disclose the transmitters being capable of generating frequencies in the range of 20-100 KHz.

Jones, Jr. teaches the transmitters being capable of generating frequencies in the range of 20-100 KHz (see col. 3, lines 30-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Gilboa in combination with Rotier's method to include the transmitters being capable of generating frequencies in the range of 20-100 KHz, as taught by Jones, Jr., in order to diminish the noise to signal ratio.

***Allowable Subject Matter***

5. Claims 9-14 are allowed.

U. S. Patent No. 5,646,525 to Gilboa in view of U. S. Patent No. 5,307,072 to Jones, Jr. and U. S. Patent No. 4,829,250 to Rotier are references closest to the claimed invention. Gilboa in combination with Jones, Jr. and Rotier disclose a method for determining the position, velocity and acceleration of an object, comprising: providing a three dimensional fixed reference frame of known dimensions; providing an object, the position, velocity and acceleration of which are to be measured; generating electrical current from an oscillator; delivering the current from the oscillator to a power amplifier; directing the amplified current from the amplifier to a plurality of transmitters; generating a magnetic field from a plurality of magnetic field transmitters in the reference frame; receiving the magnetic field signal from the transmitter into at least one receiver; demodulating and amplifying the received magnetic field signal into magnetic field components from the receiver signal in which the output from the amplifier is proportion to the magnetic field components. However, Gilboa in combination with Jones, Jr. and Rotier do not teach applying an extended Kalman filter utilizing a mathematical algorithm to

Art Unit: 2857

the demodulated and amplified signal to calculate the position, velocity and acceleration of the object; and including all of the other limitations in the respective independent claims.

***Response to Arguments***

6. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. Tsai whose telephone number is (703) 305-0851. The examiner can normally be reached on Monday-Friday from 7:30 AM to 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703) 308-1677. The fax number for TC 2800 is (703) 308-7382. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2800 receptionist whose telephone number is (703) 308-1782.

In order to reduce pendency and avoid potential delays, Group 2800 is encouraging FAXing of responses to Office actions directly into the Group at (703) 308-7382. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2800 will be promptly forwarded to the examiner.

Carol S. W. Tsai

10/20/03

  
MARC S. HOFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800